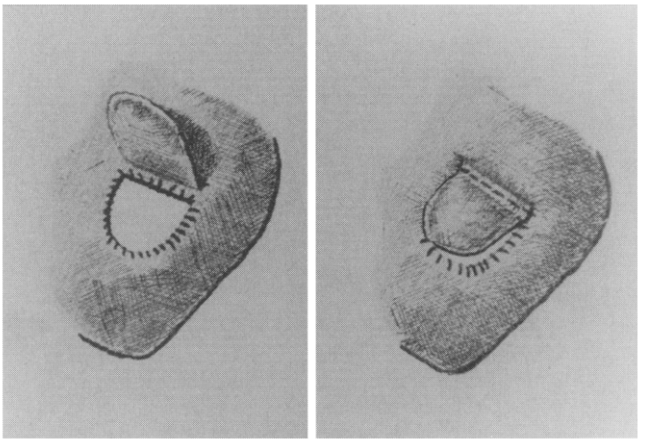

Fig. 1. One-way, valved, atrial septal patch. (From Luluaga IT, Yosifides de Luluagi I. Cierre gradual de las communicaciones interauriculares con severa hypertensión pulmonar: presentación de dos casos operados. Arch Fund Roux-Ocefa 1969;3:101-4; published with the permission of Roux-Ocefa Foundation.)

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12/8/69341

Reply to the Editor:

The observations described by George, Black, and Boscoe are interesting. They appear to corroborate the beneficial effects of nitric oxide that my colleagues and I described—reduction of acutely increased pulmonary vascular resistance after cardiopulmonary bypass (CPB) during implantation of a left ventricular assist system (LVAS).

We would like to comment specifically on their question about the 30-minute delay that we observed before the beneficial effect of nitric oxide administration became apparent.

We agree that nitric oxide administration is followed by a rapid (i.e., <5 minutes) decrease in pulmonary vascular resistance. In fact, we observed a rapid decrease in pulmonary artery pressure. However, inasmuch as our patient was supported by CPB, right ventricular preload was reduced, so that the LVAS could not fill completely and LVAS output was thus unable to increase significantly. However, peak LVAS filling volume rapidly increased, which confirmed that the patient's hemodynamic status had improved. After almost 30 minutes the situation appeared to be stable, with no further decrease in pulmonary vascular resistance or increase in pump filling rate. We completely agree that this beneficial effect was a combination of nitric oxide administration, which reduces right ventricular afterload, and possible recovery of right ventricular function as a result of prolonged CPB. This was precisely what we hoped to achieve by waiting 30 minutes with the patient supported by complete CPB. Nevertheless, when CPB support was progressively reduced, so that right ventricular preload increased, the beneficial effects of a reduced right ventricular afterload became evident, as indicated by satisfactory LVAS output.

Regarding the problem of demonstrating the beneficial effects of nitric oxide administration, we took great care to maintain an appropriate nitric oxide concentration when the patient was transported to the intensive care unit or when the cylinder was changed.

Finally, George, Black, and Boscoe expressed concern regarding the poor prognosis of bridge to transplantation with an implantable LVAS alone in patients requiring nitric oxide administration. We still believe that this therapeutic approach allowed us to reduce the increase in pulmonary vascular resistance resulting from CPB, thus affording the possibility for progressive right ventricular recovery. This apparently was the case with our patient, who underwent successful transplantation 3 months after LVAS implantation.

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Valved atrial septal patch

To the Editor:

I read with interest the article of Ad and associates[1] from the Beilinson and Tel-Aviv Medical Centers on their experimental results achieved with a one-way, valved, atrial septal patch. The patch was to be used in the management of postoperative right heart failure in patients with congenital heart defects characterized by hypoplastic right ventricle or pulmonary hypertension. At the end of the article they suggested that a prospective clinical trial should be done.

In 1967, Luluaga and Yosifides de Luluaga[2] performed a similar operation to treat atrial septal defect with severe pulmonary hypertension in two patients, with uneventful recovery. The photograph of the patch (Fig. 1) is similar to that used in dogs by Ad and associates.

I am delighted to call attention to a scientific contribution made 25 years ago.

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12/8/66461

Reply to the Editor:

We thank Dr. Leyro-Diaz for bringing to our attention the report by Drs. Luluaga and Yosifides de Luluaga on their clinical experience. Their work, in which they used a device closely resembling ours, is very important. Such an experience with two patients with an atrial septal defect and pulmonary hypertension contributes greatly to the establishment of this surgical concept of decompressing the right ventricle through an interatrial communication to reduce the risk of postoperative right heart failure. We congratulate Drs. Luluaga and Yosifides de Luluaga for this early work. We wish their work had been published in the English medical literature, so that it would have been available to English-speaking physicians.

A prospective clinical trial comprising 15 patients has already been performed and will be published in THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY. In this trial, patients for whom the one-way, valved, atrial septal patch was deemed suitable were divided into three groups: group 1 comprised patients with hypoplastic right ventricle, small tricuspid valve, and severe pulmonic stenosis or atresia; group 2 comprised patients with high pulmonary vascular resistance resulting from a large left-to-right shunt from an atrial or ventricular septal defect; and group 3 comprised patients with intraoperative acute right heart failure developing after complete repair of their congenital malformation. The right heart failure was resistant to maximal pharmacologic treatment, and the device was used as a last resort to wean the patients from cardiopulmonary bypass.

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12/8/66462

Monofilament polypropylene sutures in aortic valve replacement

To the Editor:

We read with interest a recent article from Gott and associates[1] reporting extremely low rates of thromboembolism after aortic root replacement. The authors speculated in their discussion section that the lower incidence of thromboembolism may have been related to the fact that the valve sutures, pledgets, knots, and much of the valve sewing ring are excluded from the bloodstream in a composite graft but remain exposed in isolated valve replacement. We agree with this statement and believe that suture material may increase the likelihood of morbid complications such as thromboembolism and prosthetic valve endocarditis (PVE) after cardiac operations. Despite major advances, such as the development of antimicrobial prophylaxis, better preoperative preparation of the skin, improved surgical techniques, early, aggressive treatment of wound infection, and prevention of low-output syndrome after operation, PVE continues to complicate the course of 2% to 4% of patients after cardiac valve replacement.[2] We report here our experiences related to PVE after aortic valve replacement (AVR).

In the early phase of cardiac surgery at our hospital, polyfilament suture material was used in AVR. We analyzed the cases of a series of 283 patients operated on from 1972 to 1984. In this series, all prostheses basically had interrupted single sutures without pledgets. Eleven of the patients (4.1%) had infective PVE or periprosthetic leakage and had to undergo reoperation. At reoperation, swelling and untying of the polyfilament sutures and penetration of infection deeply into the aortic wall along the sutures, causing annular abscesses, were encountered. This experience led us to change the suture material, and since the mid-1980s we have routinely used 2-0 Prolene sutures (Ethicon, Inc., Somerville, N.J.) in all AVRs, inserting 30 to 40 interrupted single sutures without pledgets. We have now evaluated our 583 AVR operations from 1985 to 1994, and to date only one patient with infective PVE and periprosthetic leakage has needed reoperation, a rate of 0.1%.

The suture material used in cardiac valve replacements in general varies between monofilament and multifilament types. In a study on the effect of suture material on the development of vascular infection, 10^5 *Staphylococcus aureus* bacteria were injected intravenously after aortotomy closure with various materials.[3] The study indicated that monofilament, nonabsorbable sutures were less likely to be associated with suture line infection. Polyfilament material was found to have a distinctly increased bacterial affinity relative to monofilament.[4] Our experience supports this finding. We conclude that single interrupted 2-0 Prolene sutures are a safe choice for AVR.

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